

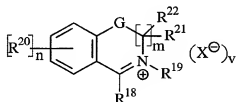
1. A bleaching composition comprising an organic catalyst compound in conjunction with or without a peroxygen source, and an anionic surfactant such that decomposition of said organic catalyst compound is resisted.

2. The composition according to Claim 1 wherein the anionic surfactant is selected from the group consisting of: linear alkylbenzene sulfonates, alpha olefin sulfonates, paraffin sulfonates, alkyl ester sulfonates, alkyl sulfates, alkyl alkoxy sulfates, alkyl sulfonates, alkyl alkoxy carboxylates, alkyl alkoxyated sulfates, sarcosinates, taurinates, and mixtures thereof.

3. The composition according to Claim 1 wherein said anionic surfactant is present in said composition at a level of from about 1% to about 40%.

4. The composition according to Claim 1 wherein said organic catalyst compound is a cationic organic catalyst compound.

5. The composition according to Claim 4 wherein said cationic organic catalyst compound has the formula:



[XI]

where the net charge is from about +3 to about -3; m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each R<sup>20</sup> is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal R<sup>20</sup> substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; R<sup>18</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; R<sup>19</sup> may be a substituted or unsubstituted, saturated or unsaturated, radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl and heterocyclic ring; G is

- selected from the group consisting of: (1) -O-; (2) -N(R<sup>23</sup>)-; and (3) -N(R<sup>23</sup>R<sup>24</sup>)-; R<sup>21</sup> - R<sup>24</sup> are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, linear or branched C<sub>1</sub> - C<sub>12</sub> alkyls, alkenes, alkoxy, aryls, alkaryl, aralkyl, cycloalkyl and heterocyclic rings; provided that any of R<sup>18</sup>, R<sup>19</sup>, R<sup>20</sup>, R<sup>21</sup> - R<sup>24</sup> may be joined together with any other of R<sup>18</sup>, R<sup>19</sup>, R<sup>20</sup>, R<sup>21</sup> - R<sup>24</sup> to form part of a common ring; any geminal R<sup>21</sup> - R<sup>22</sup> may combine to form a carbonyl; any vicinal R<sup>21</sup> - R<sup>24</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>21</sup> - R<sup>24</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety; X<sup>-</sup> is a suitable charge-balancing counterion; and v is an integer from 1 to 3.
6. The bleaching composition as claimed in claim 1 wherein said organic catalyst compound comprises from about 0.001% to about 10% by weight of said composition, and said peroxygen source, when present, comprises from about 0.01% to about 60% by weight of said composition.
7. The bleaching composition as claimed in claim 1 wherein said peroxygen source, when present, is selected from the group consisting of:
- preformed peracid compounds selected from the group consisting of percarboxylic acids and salts, percarbonic acids and salts, perimidic acids and salts, peroxymonosulfuric acids and salts, and mixtures thereof;
  - hydrogen peroxide sources selected from the group consisting of perborate compounds, percarbonate compounds, perphosphate compounds and mixtures thereof; and a bleach activator.
8. The bleaching composition according to Claim 1 wherein said bleaching composition further comprises one or more of the following detergent components selected from the group consisting of: other surfactants, solvents, buffers, enzymes, soil release agents, clay soil removal agents, dispersing agents, brighteners, suds suppressors, fabric softeners, suds boosters, enzyme stabilizers, builders, chelants, other bleaching agents, dyes, dye transfer inhibiting agents, perfumes and mixtures thereof.
9. The bleaching composition according to Claim 8 wherein said bleaching composition further comprises a chelating agent.

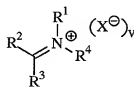
10. The bleaching composition according to Claim 8 wherein said bleaching composition further comprises other bleaching agents selected from the group consisting of perborates, percarbonates, perphosphates and mixtures thereof.
- 5 11. The bleaching composition according to Claim 10 wherein said bleaching composition further comprises a bleach activator.
12. The bleaching composition according to Claim 11 wherein said bleach activator is selected from the group consisting of hydrophobic bleach activators.
- 10 13. The bleaching composition according to Claim 11 wherein said bleach activator is selected from the group consisting of tetraacetyl ethylene diamine (TAED), benzoylcaprolactam (BzCL), 4-nitrobenzoylcaprolactam, 3-chlorobenzoylcaprolactam, benzoyloxybenzenesulphonate (BOBS), nonanoyloxybenzenesulphonate (NOBS), phenyl benzoate (PhBz),  
 15 decanoyloxybenzenesulphonate (C<sub>10</sub>-OBS), benzoylvalerolactam (BZVL), octanoyloxybenzenesulphonate (C<sub>8</sub>-OBS), perhydrolyzable esters, 4-[N-(nonaoyl) amino hexanoyloxy]-benzene sulfonate sodium salt (NACA-OBS), lauryloxybenzenesulphonate (LOBS or C<sub>12</sub>-OBS), 10-undecenoyloxybenzenesulfonate (UDOBS or C<sub>11</sub>-OBS with unsaturation in the 10 position), decanoyloxybenzoic acid (DOBA) and mixtures thereof.
- 20 14. The bleaching composition according to Claim 8 wherein said bleaching composition comprises an enzyme.
- 15 15. The bleaching composition according to Claim 14 wherein said enzyme is selected from the group consisting of cellulases, lipases, amylases, phospholipases, proteases, peroxidases and mixtures thereof.
16. A method for laundering a fabric in need of cleaning, said method comprises contacting said fabric with a laundry solution having a bleaching composition according to claim 1.
- 30 17. A laundry additive product comprising an organic catalyst compound, in conjunction with or without a peroxygen source, and an anionic surfactant.

18. The laundry additive product according to Claim 17 wherein said laundry additive product is in a dosage form selected from the group consisting of a pill, tablet, caplet, gelcap or other single dosage form.

5 19. The laundry additive product according to Claim 18 wherein said laundry additive product further includes a suitable carrier.

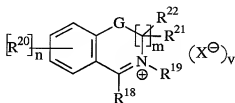
20. A bleaching composition comprising an organic catalyst compound in conjunction with or without a peroxygen source, wherein said organic catalyst compound is selected from the group consisting of:

10 (a) aryliminium cations and aryliminium polyions having a net charge of from about +3 to about -3, are represented by the formula [I]:



15 [I]

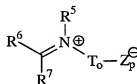
where  $\text{R}^1 - \text{R}^4$  are defined such that the aryliminium cations and aryliminium polyions having a net charge of from about +3 to about -3, are represented by the formula [XI]:



20 [XI]

where m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each  $\text{R}^{20}$  is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, carboxylic and carboalkoxy radicals, and any two vicinal  $\text{R}^{20}$  substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring, provided that when  $\text{R}^{20}$  is selected from the aryl radical, the aryl radical is not phenyl;  $\text{R}^{18}$  may be a substituted or unsubstituted radical selected from the group consisting of H,

- alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; R<sup>19</sup> is a non-linear radical selected from the group consisting of a substituted or branched radical selected from the group consisting of alkyl, cycloalkyl, alkaryl, aryl (provided that this aryl group is not phenyl), aralkyl and non-aromatic heterocyclic ring, provided that when R<sup>19</sup> is isopropyl R<sup>20</sup> is not ArCOCH<sub>3</sub>; G is selected from the group consisting of: (1) -O-; (2) -N(R<sup>23</sup>)-; and (3) -N(R<sup>23</sup>R<sup>24</sup>)-; R<sup>21</sup> - R<sup>24</sup> are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, linear or branched C<sub>1</sub>-C<sub>12</sub> alkyls, alkenes, alkoxy, aryls, alkaryl, aralkyls, cycloalkyls and heterocyclic rings; provided that any of R<sup>18</sup>, R<sup>19</sup>, R<sup>20</sup>, R<sup>21</sup> - R<sup>24</sup> may be joined together with any other of R<sup>18</sup>, R<sup>19</sup>, R<sup>20</sup>, R<sup>21</sup> - R<sup>24</sup> to form part of a common ring; any geminal R<sup>21</sup> - R<sup>22</sup> may combine to form a carbonyl; any vicinal R<sup>21</sup> - R<sup>24</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>21</sup> - R<sup>24</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety; X<sup>-</sup> is a suitable charge-balancing counterion; and v is an integer from 1 to 3.
- (b) aryliminium zwitterion bleach boosting compounds having a net charge of from about +3 to about -3, wherein said zwitterion bleach boosting compounds have the formula:



[III]

- where R<sup>5</sup> - R<sup>7</sup> are independently selected from substituted or unsubstituted radicals selected from the group consisting of H, alkyl, cycloalkyl, aryl, alkaryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic, and carboalkoxy radicals; the radical represented by the formula:

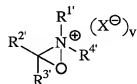


- where Z<sub>p</sub><sup>-</sup> is covalently bonded to T<sub>o</sub>, and Z<sub>p</sub><sup>-</sup> is selected from the group consisting of -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup>, -OSO<sub>3</sub><sup>-</sup>, -SO<sub>2</sub><sup>-</sup> and -OSO<sub>2</sub><sup>-</sup> and p is either 1 or 2; T<sub>o</sub> is selected from the group consisting of substituted or unsubstituted, saturated or unsaturated alkyl, cycloalkyl, aryl, alkaryl, aralkyl, and heterocyclic ring; wherein T<sub>o</sub> and Z<sub>p</sub><sup>-</sup> are selected such that



is a non-linear radical; provided that when  $R^6$  or  $R^7$  are joined to  $R^5$  by an unsubstituted phenethyl group, then  $—T_o—Z_p^\ominus$  is not  $CH_2CH(OSO_3^-)R^T$  wherein  $R^T$  is geminal dimethyl substituted alkyl, unsubstituted alkyl and phenyl radicals;

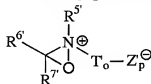
- (c) bleaching species selected from the group consisting of oxaziridinium cation  
 5 bleaching species, oxaziridinium polyion bleaching species having a net charge of from about +3 to about -3 and mixtures thereof, said cation and polyion bleaching species have the formula:



[III]

- 10 where  $R^{1'}$  -  $R^{3'}$  are independently selected from substituted or unsubstituted radicals selected from the group consisting of H, alkyl, cycloalkyl, aryl, alkaryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals;  $R^{4'}$  is a non-linear radical selected from the group consisting of substituted or branched alkyl, cycloalkyl, aryl, alkaryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals,  
 15 with the proviso that  $R^{4'}$  is not t-butyl or phenyl when  $R^{2'}$  or  $R^{3'}$  is phenyl;  $X^-$ , when present, is a suitable charge-balancing counterion; v is an integer from 1 to 3;

(d) oxaziridinium zwitterion bleaching species having a net charge of from about +3 to about -3 and mixtures thereof, said zwitterion bleaching species have the formula:



[IV]

- where  $R^5$  -  $R^7$  are independently selected from substituted or unsubstituted radicals selected from the group consisting of H, alkyl, cycloalkyl, aryl, alkaryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; also present in this  
 25 formula is the radical represented by the formula:



where  $Z_p^-$  is covalently bonded to  $T_o$ , and  $Z_p^-$  is selected from the group consisting of  $-CO_2^-$ ,  $-SO_3^-$ ,  $-OSO_3^-$ ,  $-SO_2^-$  and  $-OSO_2^-$  and p is either 1, 2 or 3;  $T_o$  is selected from the group consisting of substituted or unsubstituted, saturated or unsaturated alkyl, cycloalkyl, aryl, alkaryl, aralkyl and heterocyclic ring; wherein  $T_o$  and  $Z_p^-$  are selected such that

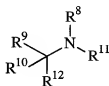
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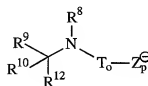
is a non-linear radical;

- (e) modified amines ([IV], [VI]) and/or modified amine oxides ([VII]-[XI]) having a net charge of from about +3 to about -3 and mixtures thereof, said modified amines and modified amine oxides have the formula:

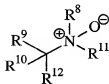
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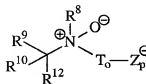
[V]



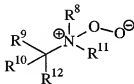
[VI]



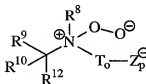
[VII]



[VIII]



[IX]



[X]

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where  $R^9 - R^{10}$  are independently selected from substituted or unsubstituted radicals selected from the group consisting of H, alkyl, cycloalkyl, aryl, alkaryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic, and carboalkoxy radicals and anionic and/or cationic charge carrying radicals;  $R^8$  and  $R^{11}$  are non-linear radicals selected from the group consisting of substituted or branched alkyl, cycloalkyl, aryl, alkaryl, aralkyl, heterocyclic

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ring, silyl, nitro, halo, cyano, alkoxy, keto and carboalkoxy radicals and anionic and/or cationic charge carrying radicals; R<sup>12</sup> is a leaving group, the protonated form of which has a pK<sub>a</sub> value (H<sub>2</sub>O reference) that falls within the following range: 37 > pK<sub>a</sub> > -2; with the proviso that any R<sup>8</sup> - R<sup>12</sup>, when present, may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; and the radical represented by the formula:



- where Z<sub>p</sub><sup>-</sup> is covalently bonded to T<sub>o</sub>, and Z<sub>p</sub><sup>-</sup> is selected from the group consisting of -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup>, -OSO<sub>3</sub><sup>-</sup>, -SO<sub>2</sub><sup>-</sup> and -OSO<sub>2</sub><sup>-</sup> and p is either 1, 2 or 3; T<sub>o</sub> is selected from the group consisting of substituted or unsubstituted, saturated or unsaturated alkyl, cycloalkyl, aryl, alkaryl, aralkyl and heterocyclic ring; wherein T<sub>o</sub> and Z<sub>p</sub><sup>-</sup> are selected such that



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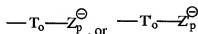
is a non-linear radical; and

(f) mixtures thereof.

21. The bleaching composition according to Claim 20 wherein R<sup>12</sup> is a leaving group, wherein the protonated form of said leaving group has a pK<sub>a</sub> value (H<sub>2</sub>O reference) within the range 23 > pK<sub>a</sub> > 3.

22. The bleaching composition according to Claim 20 wherein said R<sup>1'</sup>, R<sup>4'</sup>, R<sup>5</sup>, R<sup>5'</sup>, R<sup>8</sup>, R<sup>11</sup>,

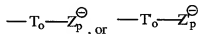
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when present, includes branching at one or more of the following positions, when present, alpha, beta, gamma, delta and epsilon positions.

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23. The bleaching composition according to Claim 22 wherein said R<sup>1'</sup>, R<sup>4'</sup>, R<sup>5</sup>, R<sup>5'</sup>, R<sup>8</sup>, R<sup>11</sup>,



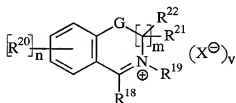


when present, includes branching at the beta position.

24. The bleaching composition according to Claim 20 wherein said modified amines and modified amine oxides are selected from the group consisting of modified amines wherein  $R^{12}$ , the leaving group, is a radical selected from the group consisting of substituted or unsubstituted, saturated or unsaturated hydroxy, perhydroxy, alkoxy and peralkoxy radicals.

25. The bleaching composition as claimed in claim 20 wherein said organic catalyst compound is selected from the group consisting of the following:

(a) aryliminium cation bleach boosting compounds or aryliminium polyion bleach boosting compounds, having a net charge of from about +3 to about -3, and mixtures thereof, wherein said cation and polyion bleach boosting compounds have the formula:

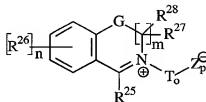


[XI]

where m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each  $R^{20}$  is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal  $R^{20}$  substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring;  $R^{18}$  may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals;  $R^{19}$  is a non-linear radical selected from the group consisting of substituted or branched radical alkyl, cycloalkyl, alkaryl, aryl, aralkyl and heterocyclic ring; G is selected from the group consisting of: (1) -O-; (2) -N( $R^{23}$ )-; and (3) -N( $R^{23}R^{24}$ )-;  $R^{21}$  -  $R^{24}$  are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, linear or branched  $C_1$ - $C_{12}$  alkyls, alkenes, alkoxy, aryls, alkaryls, aralkyls, cycloalkyls and heterocyclic rings; provided that any of  $R^{18}$ ,  $R^{19}$ ,  $R^{20}$ ,  $R^{21}$  -  $R^{24}$  may be joined together with any other of  $R^{18}$ ,  $R^{19}$ ,  $R^{20}$ ,  $R^{21}$  -  $R^{24}$  to form part of a common ring; any geminal  $R^{21}$  -  $R^{22}$  may combine to form a carbonyl; any vicinal  $R^{21}$  -  $R^{24}$

may join to form unsaturation; and wherein any one group of substituents  $R^{21}$  -  $R^{24}$  may combine to form a substituted or unsubstituted fused unsaturated moiety;

(b) aryliminium zwitterions having the formula:



[XII]

where m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each  $R^{26}$  is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal  $R^{26}$  substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring;  $R^{25}$  may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; also present in this formula is the radical represented by the formula:



where  $Z_p^{\ominus}$  is covalently bonded to  $T_o$ , and  $Z_p^{\ominus}$  is selected from the group consisting of

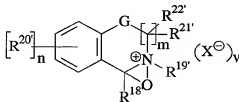
$-CO_2^-$ ,  $-SO_3^-$ ,  $-OSO_3^-$ ,  $-SO_2^-$  and  $-OSO_2^-$  and p is either 1, 2 or 3;  $T_o$  is selected from the group consisting of:



wherein q is an integer from 1 to 8;  $R^{29}$  is independently selected from substituted or unsubstituted radicals selected from the group consisting of linear or branched H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylene, heterocyclic ring, alkoxy, arylcarbonyl, carboxyalkyl and amide groups, provided that all  $R^{29}$  groups are not independently selected to be H; G is selected from the group consisting of: (1) -O-; (2) -N( $R^{30}$ )-; and (3) -N( $R^{30}$  $R^{31}$ )-;  $R^{27}$ ,  $R^{28}$ ,  $R^{30}$  and  $R^{31}$  are substituted or unsubstituted radicals independently selected from the group

consisting of H, oxygen, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkenes, heterocyclic ring, alkoxys, arylcarbonyl groups, carboxyalkyl groups and amide groups; any of R<sup>25</sup>, R<sup>26</sup>, R<sup>27</sup>, R<sup>28</sup>, R<sup>30</sup> and R<sup>31</sup> may be joined together with any other of R<sup>25</sup>, R<sup>26</sup>, R<sup>27</sup>, R<sup>28</sup>, R<sup>30</sup> and R<sup>31</sup> to form part of a common ring; any geminal R<sup>27</sup> - R<sup>28</sup> may combine to form a carbonyl; any vicinal R<sup>27</sup> - R<sup>31</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>27</sup> - R<sup>31</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety;

(c) oxaziridinium cations and oxaziridinium polyions having a net charge of from about +3 to about -3, and having the formula:

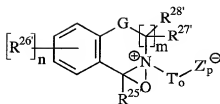


[XIII]

wherein m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each R<sup>20'</sup> is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal R<sup>20'</sup> substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; R<sup>18'</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; R<sup>19'</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl and heterocyclic ring. G is selected from the group consisting of: (1) -O-; (2) -N(R<sup>23'</sup>)-; and (3) -N(R<sup>23'</sup>R<sup>24'</sup>)-; R<sup>21'</sup> - R<sup>24'</sup> are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, linear or branched C<sub>1</sub>-C<sub>12</sub> alkyls, alkenes, alkoxys, aryls, alkaryl, aralkyls, cycloalkyls and heterocyclic rings; provided that any of R<sup>18'</sup>, R<sup>19'</sup>, R<sup>21'</sup> - R<sup>24'</sup> may be joined together with any other of R<sup>18'</sup>, R<sup>19'</sup>, R<sup>21'</sup> - R<sup>24'</sup> to form part of a common ring; any geminal R<sup>21'</sup> - R<sup>22'</sup> may combine to form a carbonyl; any vicinal R<sup>21'</sup> - R<sup>24'</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>21'</sup> - R<sup>24'</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety; and wherein any one group of substituents R<sup>21'</sup> - R<sup>24'</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety;

(d) oxaziridinium zwitterions having a net charge of from about +3 to about -

3 and having the formula:



[XIV]

- 5 wherein m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each R<sup>26'</sup> is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal R<sup>26'</sup> substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; R<sup>25'</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; also present in this formula is the radical represented by the formula:



- 15 where Z'<sub>p</sub><sup>-</sup> is covalently bonded to T', and Z'<sub>p</sub><sup>-</sup> is selected from the group consisting of -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup>, -OSO<sub>3</sub><sup>-</sup>, -SO<sub>2</sub><sup>-</sup> and -OSO<sub>2</sub><sup>-</sup>, and p is either 1 or 2; T' is selected from the group consisting of:



- 20 wherein q is an integer from 1 to 8; R<sup>29'</sup> is independently selected from substituted or unsubstituted radicals selected from the group consisting of linear or branched H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylene, heterocyclic ring, alkoxy, arylcarbonyl, carboxyalkyl and amide groups, provided that all R<sup>29'</sup> groups are not independently selected to be H; G is selected from the group consisting of: (1) -O-; (2) -N(R<sup>30'</sup>)-; and (3) -N(R<sup>30'</sup>R<sup>31'</sup>)-; R<sup>27'</sup>, R<sup>28'</sup>, R<sup>30'</sup> and R<sup>31'</sup> are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylenes, heterocyclic ring, alkoxys, arylcarbonyl groups, carboxyalkyl groups and amide groups; any of R<sup>25'</sup>, R<sup>26'</sup>, R<sup>27'</sup>, R<sup>28'</sup>, R<sup>30'</sup> and R<sup>31'</sup> may be joined together with any other of R<sup>25'</sup>, R<sup>26'</sup>, R<sup>27'</sup>, R<sup>28'</sup>, R<sup>30'</sup> and

R<sup>31'</sup> to form part of a common ring; any geminal R<sup>27'</sup>-R<sup>28'</sup> may combine to form a carbonyl; any vicinal R<sup>27'</sup>-R<sup>31'</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>27'</sup>-R<sup>31'</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety; provided that the radical represented by the formula:

5



is a non-linear radical; and further provided that the radical represented by the formula:

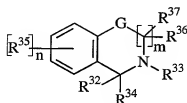
10



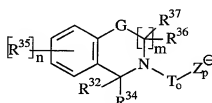
is not CH<sub>2</sub>CH(OSO<sub>3</sub><sup>-</sup>)R<sup>41</sup> wherein R<sup>41</sup> is selected from the group consisting of geminal dimethyl substituted alkyl, unsubstituted alkyl and phenyl;

(e) modified amines (XV, XVI) and/or modified amine oxides (XVII, XVIII, XIX,

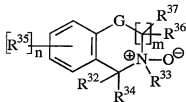
15 XX) and mixtures thereof, having the formula:



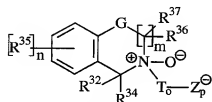
[XV]



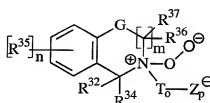
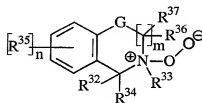
[XVI]



[XVII]



[XVIII]



20

[XIX]

[XX]

- where m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each R<sup>35</sup> is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal R<sup>35</sup> substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; R<sup>32</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; R<sup>33</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring and a radical represented by the formula:



- where Z<sub>p</sub><sup>-</sup> is covalently bonded to T<sub>o</sub>, and Z<sub>p</sub><sup>-</sup> is selected from the group consisting of -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup>, -OSO<sub>3</sub><sup>-</sup>, -SO<sub>2</sub><sup>-</sup> and -OSO<sub>2</sub><sup>-</sup>, and p is either 1, 2 or 3; T<sub>o</sub> is selected from the group consisting of:



- wherein q is an integer from 1 to 8; R<sup>38</sup> is independently selected from substituted or unsubstituted radicals selected from the group consisting of linear or branched H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylene, heterocyclic ring, alkoxy, arylcarbonyl, carboxyalkyl and amide groups, provided that all R<sup>38</sup> groups are not independently selected to be H; G is selected from the group consisting of: (1) -O-; (2) -N(R<sup>39</sup>)-; and (3) -N(R<sup>39</sup>R<sup>40</sup>)-; R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkenes, heterocyclic ring, alkoxy, arylcarbonyl groups, carboxyalkyl groups and amide groups; any of R<sup>32</sup>, R<sup>33</sup>, R<sup>34</sup>, R<sup>35</sup>, R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> may be joined together with any other of R<sup>32</sup>, R<sup>33</sup>, R<sup>34</sup>, R<sup>35</sup>, R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> to form part of a common ring; any geminal R<sup>36</sup>, R<sup>37</sup> may combine to form a carbonyl; any vicinal R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety; provided that the radical represented by the formula:

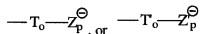


is a non-linear radical; and

f) mixtures thereof.

5

26. The bleaching composition according to Claim 25 wherein said R<sup>19</sup>, R<sup>19'</sup>, R<sup>33</sup>,



10 when present, includes branching at one or more of the following positions, when present, alpha, beta, gamma, delta and epsilon positions.

27. The bleaching composition as claimed in claim 25 wherein said organic catalyst  
 15 compound is selected from the group consisting of: (1) aryliminium cations or polyions of the formula [XI] wherein R<sup>18</sup> is H or methyl, and R<sup>19</sup> is H or substituted or branched C<sub>1</sub> - C<sub>14</sub> alkyl or cycloalkyl; (2) oxaziridinium cations or polyions of the formula [XIII] wherein R<sup>18'</sup> is H or methyl, and R<sup>19'</sup> is H or substituted or branched C<sub>1</sub> - C<sub>14</sub> alkyl or cycloalkyl; (3) modified amines or amine oxides of the formula [XV], [XVII], [XIX] wherein R<sup>18</sup> is H or methyl, and R<sup>19</sup> is H or substituted or branched C<sub>1</sub> - C<sub>14</sub> alkyl or cycloalkyl; (4) aryliminium zwitterions of the  
 20 formula [XII] wherein R<sup>25</sup> is H or methyl, and for the radical represented by the formula:



Z<sub>p</sub><sup>-</sup> is -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup> or -OSO<sub>3</sub><sup>-</sup>, and p is 1 or 2.

25

28. The bleaching composition as claimed in claim 27 wherein said organic catalyst  
 30 compound is selected from the group consisting of: (1) aryliminium cations or polyions of the formula [XI] wherein R<sup>18</sup> is H or methyl, and R<sup>19</sup> is substituted or branched C<sub>1</sub> - C<sub>14</sub> alkyl or cycloalkyl; (2) oxaziridinium cations or polyions of the formula [XIII] wherein R<sup>18'</sup> is H or methyl, and R<sup>19'</sup> is substituted or branched C<sub>1</sub> - C<sub>14</sub> alkyl or cycloalkyl; (3) modified amines or amine oxides of the formula [XV], [XVII], [XIX] wherein R<sup>18</sup> is H or methyl, and R<sup>19</sup> is substituted or branched C<sub>1</sub> - C<sub>14</sub> alkyl or cycloalkyl; (4) aryliminium zwitterions of the formula [XII] wherein R<sup>25</sup> is H or methyl, and for the radical represented by the formula:



$Z^-$  is  $-CO_2^-$ ,  $-SO_3^-$  or  $-OSO_3^-$ ,  $p$  is 1 and  $T_o$  is selected from the group consisting of:



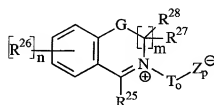
- 5 wherein  $q$  is an integer from 2 to 4, and  $R^{38}$  is independently selected from the group consisting of H and linear or branched  $C_1-C_{18}$  substituted or unsubstituted alkyl, cycloalkyl or aryl; provided that at least one  $R^{38}$  is not H.
- 10 29. The bleaching composition as claimed in claim 20 wherein said organic catalyst compound comprises from about 0.001% to about 10% by weight of said composition, and said peroxygen source, when present, comprises from about 0.01% to about 60% by weight of said composition.
- 15 30. The bleaching composition as claimed in claim 20 wherein said peroxygen source, when present, is selected from the group consisting of:
- (a) preformed peracid compounds selected from the group consisting of percarboxylic acids and salts, percarbonic acids and salts, perimidic acids and salts, peroxymonosulfuric acids and salts, and mixtures thereof;
- 20 (b) hydrogen peroxide sources selected from the group consisting of perborate compounds, percarbonate compounds, perphosphate compounds and mixtures thereof; and a bleach activator.
31. The bleaching composition as claimed in claim 20 wherein said bleaching composition further comprises a surfactant.
- 25 32. The bleaching composition as claimed in claim 31 wherein said surfactant is an anionic surfactant.
- 30 33. The bleaching composition as claimed in claim 20 wherein said bleaching composition further comprises an enzyme.



34. The bleaching composition as claimed in claim 20 wherein said bleaching composition further comprises a chelating agent.

35. A laundry organic catalyst compound selected from the group consisting of

- 5 (a) aryliminium zwitterions having the formula:



[XII]

- 10 where m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each R<sup>26</sup> is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal R<sup>26</sup> substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; R<sup>25</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; the radical represented by the formula:



where Z<sub>p</sub><sup>-</sup> is covalently bonded to T<sub>o</sub>, and Z<sub>p</sub><sup>-</sup> is selected from the group consisting of -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup>, -OSO<sub>3</sub><sup>-</sup>, -SO<sub>2</sub><sup>-</sup> and -OSO<sub>2</sub><sup>-</sup> and p is either 1, 2 or 3; T<sub>o</sub> is selected from the group consisting of:

25



wherein q is an integer from 1 to 8; R<sup>29</sup> is independently selected from substituted or unsubstituted radicals selected from the group consisting of linear or branched H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylene, heterocyclic ring, alkoxy, arylcarbonyl, carboxyalkyl

and amide groups, provided that all R<sup>29</sup> groups are not independently selected to be H; G is selected from the group consisting of: (1) -O-; (2) -N(R<sup>30</sup>)-; and (3) -N(R<sup>30</sup>R<sup>31</sup>)-; R<sup>27</sup>, R<sup>28</sup>, R<sup>30</sup> and R<sup>31</sup> are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkenes, heterocyclic ring, alkoxy, alkylcarbonyl groups, carboxyalkyl groups and amide groups; any of R<sup>25</sup>, R<sup>26</sup>, R<sup>27</sup>, R<sup>28</sup>, R<sup>30</sup> and R<sup>31</sup> may be joined together with any other of R<sup>25</sup>, R<sup>26</sup>, R<sup>27</sup>, R<sup>28</sup>, R<sup>30</sup> and R<sup>31</sup> to form part of a common ring; any geminal R<sup>27</sup> - R<sup>28</sup> may combine to form a carbonyl; any vicinal R<sup>27</sup> - R<sup>31</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>27</sup> - R<sup>31</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety; and provided that the radical represented by the formula:

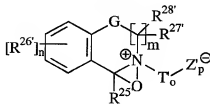


is a non-linear radical; and further provided that the radical represented by the formula:



is not CH<sub>2</sub>CH(OSO<sub>3</sub><sup>-</sup>)R<sup>41</sup> wherein R<sup>41</sup> is selected from the group consisting of geminal dimethyl substituted alkyl, unsubstituted alkyl and phenyl;

(b) oxaziridinium zwitterions having the formula:



[XIV]

wherein m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each R<sup>26'</sup> is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal R<sup>26'</sup> substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; R<sup>25'</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano,

sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; the radical represented by the formula:



- 5 where  $Z_p^{\ominus}$  is covalently bonded to  $T_o$ , and  $Z_p^{\ominus}$  is selected from the group consisting of  $-CO_2^{\ominus}$ ,  $-SO_3^{\ominus}$ ,  $-OSO_3^{\ominus}$ ,  $-SO_2^{\ominus}$  and  $-OSO_2^{\ominus}$ , and p is either 1 or 2;  $T_o$  is selected from the group consisting of:



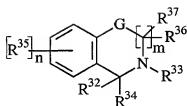
- wherein q is an integer from 1 to 8;  $R^{29'}$  is independently selected from substituted or  
 10 unsubstituted radicals selected from the group consisting of linear or branched H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylene, heterocyclic ring, alkoxy, arylcarbonyl, carboxyalkyl and amide groups, provided that all  $R^{29'}$  groups are not independently selected to be H; G is selected from the group consisting of: (1)  $-O-$ ; (2)  $-N(R^{30'})-$ ; and (3)  $-N(R^{30'}R^{31'})-$ ;  $R^{27'}$ ,  $R^{28'}$ ,  $R^{30'}$  and  $R^{31'}$  are substituted or unsubstituted radicals independently selected from the group  
 15 consisting of H, oxygen, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylenes, heterocyclic ring, alkoxy, arylcarbonyl groups, carboxyalkyl groups and amide groups; any of  $R^{25'}$ ,  $R^{26'}$ ,  $R^{27'}$ ,  $R^{28'}$ ,  $R^{30'}$  and  $R^{31'}$  may be joined together with any other of  $R^{25'}$ ,  $R^{26'}$ ,  $R^{27'}$ ,  $R^{28'}$ ,  $R^{30'}$  and  $R^{31'}$  to form part of a common ring; any geminal  $R^{27'}$ - $R^{28'}$  may combine to form a carbonyl; any vicinal  $R^{27'}$ - $R^{31'}$  may join to form unsaturation; and wherein any one group of substituents  $R^{27'}$ - $R^{31'}$  may combine to form a substituted or unsubstituted fused unsaturated moiety; provided that  
 20 the radical represented by the formula:



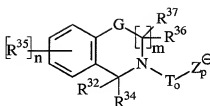
- is a non-linear radical; and further provided that the radical represented by the formula:  
 25



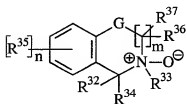
- is not  $CH_2CH(OSO_3^{\ominus})R^{41}$  wherein  $R^{41}$  is selected from the group consisting of geminal dimethyl substituted alkyl, unsubstituted alkyl and phenyl;  
 30 (c) modified amines (XV, XVI) and/or modified amine oxides (XVII, XVIII, XIX, XX) and mixtures thereof, having the formula:



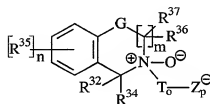
[XV]



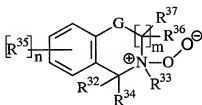
[XVI]



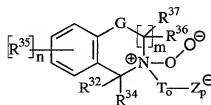
[XVII]



[XVIII]



[XIX]



[XX]

- where m is 1 to 3 when G is present and m is 1 to 4 when G is not present; n is an integer from 0 to 4; and each R<sup>35</sup> is independently selected from a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, aryl, fused aryl, heterocyclic ring, fused heterocyclic ring, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals, and any two vicinal R<sup>35</sup> substituents may combine to form a fused aryl, fused carbocyclic or fused heterocyclic ring; R<sup>32</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring, silyl, nitro, halo, cyano, sulfonato, alkoxy, keto, carboxylic and carboalkoxy radicals; R<sup>33</sup> may be a substituted or unsubstituted radical selected from the group consisting of H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, heterocyclic ring and a radical represented by the formula:



- where Z<sub>p</sub><sup>-</sup> is covalently bonded to T<sub>o</sub>, and Z<sub>p</sub><sup>-</sup> is selected from the group consisting of -CO<sub>2</sub><sup>-</sup>, -SO<sub>3</sub><sup>-</sup>, -OSO<sub>3</sub><sup>-</sup>, -SO<sub>2</sub><sup>-</sup> and -OSO<sub>2</sub><sup>-</sup>, and p is either 1 or 2; T<sub>o</sub> is selected from the group consisting of:



- wherein q is an integer from 1 to 8; R<sup>38</sup> is independently selected from substituted or unsubstituted radicals selected from the group consisting of linear or branched H, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylene, heterocyclic ring, alkoxy, arylcarbonyl, carboxyalkyl and amide groups, provided that all R<sup>38</sup> groups are not independently selected to be H; G is selected from the group consisting of: (1) -O-; (2) -N(R<sup>39</sup>)-; and (3) -N(R<sup>39</sup>R<sup>40</sup>)-; R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> are substituted or unsubstituted radicals independently selected from the group consisting of H, oxygen, alkyl, cycloalkyl, alkaryl, aryl, aralkyl, alkylenes, heterocyclic ring, alkoxys, arylcarbonyl groups, carboxyalkyl groups and amide groups; any of R<sup>32</sup>, R<sup>33</sup>, R<sup>34</sup>, R<sup>35</sup>, R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> may be joined together with any other of R<sup>32</sup>, R<sup>33</sup>, R<sup>34</sup>, R<sup>35</sup>, R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> to form part of a common ring; any geminal R<sup>36</sup>, R<sup>37</sup> may combine to form a carbonyl; any vicinal R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> may join to form unsaturation; and wherein any one group of substituents R<sup>36</sup>, R<sup>37</sup>, R<sup>39</sup> and R<sup>40</sup> may combine to form a substituted or unsubstituted fused unsaturated moiety; provided that the radical represented by the formula:



is a non-linear radical; and

- d) mixtures thereof.

36. A method for laundering a fabric in need of laundering, said method comprises contacting said fabric with a laundry solution having a bleaching composition according to claim 20.
37. A laundry additive product comprising a bleaching composition according to claim 20.
38. A laundry additive product comprising a bleaching composition according to claim 25.
39. A laundry additive product comprising an organic catalyst compound according to claim 35.

40. The laundry additive product as claimed in claim 37 wherein said laundry additive product is in a dosage form selected from the group consisting of a pill, tablet, caplet, gelcap or other single dosage form.
- 5 41. The laundry additive product as claimed in claim 38 wherein said laundry additive product is in a dosage form selected from the group consisting of a pill, tablet, caplet, gelcap or other single dosage form.
- 10 42. The laundry additive product as claimed in claim 39 wherein said laundry additive product is in a dosage form selected from the group consisting of a pill, tablet, caplet, gelcap or other single dosage form.
43. The laundry additive product as claimed in claim 37 wherein said laundry additive further includes a suitable carrier.
- 15 44. The bleaching composition as claimed in claim 30 wherein said bleach activator is selected from the group consisting of: tetraacetyl ethylene diamine (TAED); benzoylcaprolactam (BzCL); 4-nitrobenzoylcaprolactam; 3-chlorobenzoylcaprolactam; benzoyloxybenzenesulphonate (BOBS); nonanoyloxybenzenesulphonate (NOBS); phenyl benzoate (PhBz); decanoyloxybenzenesulphonate (C<sub>10</sub>-OBS); benzoylvalerolactam (BZVL); octanoyloxybenzenesulphonate (C<sub>8</sub>-OBS); perhydrolyzable esters; 4-[N-(nonanoyl) amino hexanoyloxy]-benzene sulfonate sodium salt (NACA-OBS); lauroyloxybenzenesulfonate (LOBS or C<sub>12</sub>-OBS); 10-undecenoyloxybenzenesulfonate (UDOBS); decanoyloxybenzoic acid (DOBA) and mixtures thereof.
- 25